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THE ROLE OF HIGHWAYS IN RURAL ECONOMIC DEVELOPMENT

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SUMMARY

This study was undertaken to determine the role which highways can play in developing the economy of poverty striken rural areas. Highways constructed for this purpose are termed "development highways." These highways, including pertinent characteristics, are discussed in Chapter I.

A development highway is, of course, just one of a number of steps taken to improve a depressed economy. The decision to use (or not to use) this particular tool should, therefore, be made only after careful consideration of other appropriate steps. Depending on local conditions, these may be employed in lieu of, or as a supplement to, development highway construction. Accordingly, several alternative (or supplementary) policies for improving the economy of distressed rural areas are reviewed in Chapter II.

Development highway systems have been planned for the Appalachian Region and the Upper Great Lakes Economic Development (UGLED) Region. These highway systems are used as examples for this study and are discussed in Chapter III.

The selection of locations for development highways is addressed in Chapter IV. Criteria for evaluating economically depressed rural communities to determine ones which have a potential for an expanded economy are explained.

Development highways are planned and constructed for the primary purpose of generating traffic rather than serving existing traffic demands. These

highways generate traffic by stimulating commutation to job centers and by "opening up" areas where development has been inhibited by lack of access.

Alternative or supplementary measures for improving depressed economies include aid to education, increased welfare, planned out-migration, investment in capital facilities, and investment in natural resources. This thesis briefly discusses the advantages and disadvantages of these alternatives which should be given appropriate consideration in any analysis looking toward the construction of development highways as a means of improving depressed economies.

Two development highway systems are selected for detailed consideration in this paper. The Appalachian Development Highway System was planned as part of a comprehensive development program for the Appalachian Region. Construction of this system has been financed by the states and federal government and is not complete at this writing. Early evaluation of completed highway sections indicate that the local economy has benefited from increased accessibility to jobs in nearby employment centers.

The second system of development highways discussed in this paper is a system planned for the Upper Great Lakes Economic Development Region. These highways were planned jointly by the highway departments of Michigan, Wisconsin, and Minnesota. The two main objectives of the UGLED highway system are to attract tourists and develop the region's mining and forest industries.

Locations for development highways are selected by determining which communities are likely to benefit the most in terms of regional economic growth if

accessibility is improved with a new highway. The goal is to maximize jobs and income so attention will usually focus on those communities which have the potential to become major centers of growth and employment, tourist and recreation activities, or natural resource production.

Some of the factors which may be used to evaluate an area's potential for long-term growth and development include: (1) the scale (size or volume) of economic activity; (2) the stability of the local economy; (3) the presence or absence of industrial linkages within the local economy; (4) the degree of diversity represented in the economy; (5) the community's competitive position relative to other cities of similar size and function; and (6) the availability of commercially exploitable resources.

The conclusion of this study is that highways may be used successfully to stimulate the economy of distressed areas if: (1) the highways make the area accessible to one or more urban growth centers; or (2) raw materials, labor, and markets are made accessible to new growth centers; and (3) a complementary program of aid to education, vocational training, health facilities, and/or housing is implemented in addition to the highway system.

INTRODUCTION

Highways play three distinct roles in the economic development of rural areas. The first of these roles involves the movement of products and people out of an area. Outbound products might typically include raw materials (mineral or forest) or goods that have been manufactured or processed in some way. Outbound people might typically include students, workers, or consumers.

The second role which highways play in contributing to the economic development of a rural area involves moving people and goods into the area. Inbound people might typically include tourists, vacationers, and people who move into the area for retirement. Inbound goods might typically include raw or semi-finished materials for processing or assembly by residents, or finished goods for local consumption.

The third major role played by highways which contributes to the economic development of an area is the creation or attraction of jobs. Jobs are created directly, of course, by construction and maintenance of the highway. Other jobs with a more lasting contribution to the economy are created as a result of new plants and businesses which are attracted by the highway. Resort development and other tourist or vacation-oriented activities also open jobs after highways provide access.

Purpose

There are many alternative policies which could be followed to improve the economy of a rural area. These include aid to education, increased welfare, investment in capital facilities such as roads, and investment in natural resources. Another policy, planned out-migration, could be used to improve the per capita income both of persons moving out and persons remaining in an area.

The purpose of this thesis is to examine one of these policies and make recommendations for its use in improving the economy of a rural area. The policy which will be examined is investment in a well-known capital facility--highways.

Approach

The objective of this study is to evaluate the effectiveness of highways in actually accomplishing rural economic development, to examine alternative methods of rural economic development, to review two examples of development highway systems, and to describe the considerations for selecting locations for development highways. Information for this study was obtained by reviewing pertinent literature and personal interviews or correspondence with persons and agencies involved with rural economic development.

Thesis Organization

The following chapters contain a detailed discussion of development highways and their relation to rural economic growth. The first chapter defines

development highways and discusses their potential impact on a depressed economy. Chapter II examines the pros and cons of alternative methods of improving a depressed economy. Chapter III reviews the proposed development highway systems in the Appalachian Region and the Upper Great Lakes Economic Development Region. Chapter IV addresses the subject of selecting locations for development highways. Recommendations are made in this chapter for identifying communities which have the greatest potential for growth when served by a highway. The Appendix describes a method which has been used by a consulting firm to quantitatively evaluate alternative locations for a proposed development highway.

CHAPTER I

THE DEVELOPMENT HIGHWAY

This chapter will examine highways as one type of capital facility which could be chosen to stimulate the economy of a distressed area. The first section will explain what a development highway is and how it differs from typical rural highways. The second section will examine the reasonableness and logic for using public funds to build highways to stimulate a rural economy.

The term "distressed area" was used above and will be used throughout this thesis to designate any rural political unit (usually a county) or combination of such units which have a substantial and persistent surplus of unemployed labor. The U. S. Department of Labor has established criteria which provide the basis for defining such areas. These criteria were adopted in 1960 and are as follows:

1. Unemployment is now six percent or more of the labor force, discounting seasonal or temporary factors, and

2. The annual average unemployment rate in the area has been:
   (a) At least 50 percent above the national average for 3 of the preceding 4 calendar years; or
   (b) At least 75 percent above the national average for 2 of the preceding 3 calendar years; or
   (c) At least 100 percent above the national average for 1 of the preceding 2 calendar years.[1]

Definition and Explanation of Development Highways

The term, development highways, will be used here to refer to highways which are constructed to improve the economy of a distressed area. These highways are built to "open up" remote areas and increase the accessibility to and from nearby towns and cities.

The purpose of the increased accessibility provided by development highways is to initiate a chain of activities which will raise the standard of living of the people within the area. These activities may be reduced travel times to nearby job centers or new industrial plants which prefer the locational advantages provided by a new highway. Following these activities, increased commercial and residential development may be expected to occur.

Two types of development highways will be considered. These are (1) regional penetration highways and (2) local access highways.

The ways in which a development highway differs from a typical rural highway will also be discussed in this section. The differences are not in physical design but in the criteria for location since a development highway is to be a stimulus for traffic-generating activities.

Types of Development Highways

Development highways include two distinct types of roadways. One type is designed for large volumes of high-speed traffic similar to our rural interstate highways. The other type is designed for smaller volumes of moderate-speed traffic with local trip destinations or originations. These two types are explained in greater detail below.

Regional Penetration Highways. Regional penetration highways are high-quality roadways which penetrate a geographic region and provide connections to major cities outside the region. These highways are designed for through traffic and should usually be multi-lane and limited access.

It is important that regional penetration highways provide convenient and rapid access into and through the poverty region. Through routes are necessary for basic development (industrial, agricultural, mining, and recreational).[2]

Regional penetration highways may act as an extension of the Interstate Highway System in rural poverty areas. An example of this is found in the Appalachian section of Maryland. An Appalachian Development Highway will be constructed from Hancock, Maryland to Morgantown, West Virginia. It will be called the National Freeway because it parallels the historical "National Road" and has been planned using freeway standards.[3]

Local Access Highways. Local access highways are highways which provide access to adjacent land uses. The frequency of curb cuts for driveways may be controlled by local ordinance. Intersections with other roads are signalized if warranted by traffic volumes. Ideally, the local access highways provide convenient connections between the regional penetration highways and traffic-generating activities within the region.

Local access highways should service job-creating activities since these activities are essential in promoting regional economic development. Following are examples of facilities for which construction of local access highways should be seriously considered: (1) existing industrial facilities which are currently

undergoing expansion, (2) proposed facilities that have financing assured, or (3) proposed facilities where financing is contingent on a provision that the access road will be built.[4]

Local access highways accommodate many and varied trip purposes related to land use and development. The importance of these roads can be seen by recognizing that virtually all motor vehicle travel originates and terminates on local roads, whether they are "local access highways" or not.

Unique Aspects of Development Highways

Development highways differ from typical rural highways in one essential way. They are built to attract new users rather than to serve existing users now driving on a crowded roadway. The new highway is expected to act as a catalyst which will increase the movement of people and goods through the area.

A development highway attracts traffic in two ways. One way is by reducing travel times to existing trip destinations such as job centers so that the trip will be within an acceptable commuting range. This may also result in a dispersal of population from the job center as people move to residential locations along the new highway.

The second way a development highway gains traffic is by attracting new traffic-generating activities such as industrial plants. If carefully planned, the development highway will open up desirable industrial sites where land costs are cheaper than in urban areas.

Many factors must be considered when any new highway is being justified for construction with public funds. Typically, the costs for construction,

maintenance, and right-of-way are compared to user benefits in a "benefit-cost" analysis to evaluate the feasibility of highway construction. A benefit-cost analysis assigns a dollar value to the benefits of the new highway such as reduced travel times and reduced vehicle cost and compares this saving with the actual cost of the improvement. The road is considered justified if the benefits are greater than the costs. In some cases the economic impact on property immediately adjacent to the proposed highway will be considered. Rarely, however, have realistic evaluations of economic development benefits been performed for proposed highways.[5]

Developmental benefits which are used in the justification of development highways cover a variety of areas. Benefits such as new industrial sites and improved accessibility to jobs have already been mentioned. Other benefits may accrue to the tourist industry. Much of the United States which falls in the distressed area status has natural scenic beauty and could be capitalized on if high-quality roads are available for tourists. Still other benefits made possible by the accessibility of a new highway may be school consolidation, reduced fire insurance rates, reduced costs for transporting mine and forest products, etc Each of these benefits is considered when routes for development highways are compared.

Generated traffic is a factor which receives more emphasis when evaluating proposed routes for development highways than when evaluating routes for typical highways. The term "generated traffic" is used to refer to a portion of the total traffic which uses the new highway. Generated traffic is defined as traffic

which uses the new highway because of (1) trip destinations which are within commuting range only after the new highway has been completed and (2) changes in land use caused by the new highway.

The other two types of traffic which may be expected to use a new highway are normal-growth traffic and diverted traffic. Normal-growth traffic is all of the traffic which would be using the old highway if no improved facility had been built. The expected future volumes of this traffic are obtained from a study of motor fuel consumption, motor vehicle registration, population, and trends in traffic growth in the study area. Diverted traffic is traffic which will use the new facility only because it provides a quicker route to a trip destination than the route used previously.

Justification for Development Highways

This section will examine a variety of questions concerning the reasonableness and justification for building development highways. These are the type questions which could normally be expected from the public when our government selects one particular locality and method to invest general tax funds. Such questions as the following will be considered:

1. Can highways alone be expected to stimulate economic growth in a distressed area? If not, what role do highways have and what else is required?
2. Is the stimulation of a distressed area's economy a realistic goal under our current system of government?

3. Do the needs of urban areas have a higher priority than rural areas?

Role of Development Highways

Good transportation has been characteristic of the economic growth of this country from its pioneer days. Early settlements which later became cities were first dependent on water transportation. As technology advanced railroads played a dominant role in determining the future of cities such as Atlanta. In modern times an extensive highway network has permitted the movement of people and goods between all of our major and many of our minor cities.

History has taught us that transportation is a necessary part of a region's economic growth. Does this mean that improvement of the transportation system will necessarily improve a region's economy? This question will be addressed in greater detail in the following paragraphs.

Locational advantages play a significant role in determining which distressed areas can benefit from development highways. Distressed areas that are within commuting distances of established cities can realize benefits from improved road connections. Other distressed areas can share in the economy of urban centers if a new highway passing through the area creates a much improved connection between two cities with healthy economies.

Distressed areas which lack locational advantages such as those mentioned above cannot expect significant benefits from development highways in comparison to the costs required. Areas which are isolated from the rest of the country by great distance or by geographic barriers are examples.

The many results and effects of providing new and improved highway

connections between cities and depressed areas must be anticipated or they may not be entirely beneficial. A new road will create new opportunities for suburban development where water and sewer systems, schools, effective zoning policies, etc. may not exist. Careful planning will be required to provide these services efficiently.

Highways alone cannot be expected to create dynamic growth centers. The emphasis must be on creating a new environment which will be attractive to both new industry and services (non-commodity producing activities such as banking, auto repair, real estate sales, law firms, etc.). This will usually require, in addition to new highways, improvements in housing, education, medical facilities, cultural institutions, communications, and recreation. If rural regions are truly interested in becoming a part of the mainstream of American economic life, they must concentrate on centers which will shed the drab 19th Century facades, attract more white-collar jobs, and exchange provincialism for a more cosmopolitan outlook.

Realism of Goals

Is it realistic to think that the economy of a distressed area can be changed significantly by a new highway system? It is clear that highways and education improvements are necessary for a developmental program but the facts must be faced: What real incentive do these improvements provide for outside investment when urban areas are competing for the same investment with an established ability to provide the needed services? Actually there is little incentive for outside investment without some rather massive aid from an organized outside source.[6]

The only organized outside source which is likely to provide an incentive for new investments in declining areas is the federal government. This approach has been followed by advanced European countries. They have exerted a strong national influence on investment through taxation incentives, control of expansion in crowded areas, and construction of entire new cities. Their goals have been decentralized regional development and actual economic expansion in distressed areas. The experience of these countries can benefit the United States in preventing population decline of distressed areas, thus allowing such areas to participate fully in the modern economy.[7]

Rural vs. Urban Priorities

Is large-scale, public investment in rural areas justified when urban areas are plagued with problems of slums, unemployment, welfare services, etc.? This question is frequently asked when our government proposes such programs as a developmental highway system for rural areas.

Many problems in cities today are directly attributable to the influx of persons from rural origins. The reduced manpower needs of agriculture have forced many farm laborers to seek jobs in the city. This, combined with other factors, such as racial discrimination and the lure of a chance for a better life, has resulted in large numbers of low income persons moving into the nation's large cities.

One justification of federal spending in rural areas at a time of increasing urban problems is that an improved economy in rural areas will directly reduce the urban problems. The reasoning is that fewer rural persons will move to the

city if they have an adequate income at the rural location. This may seem to be a backward approach but it does have sound arguments in its favor and some evidence for support.

The intent here is not to imply that the dispersed population pattern of distressed rural regions would be continued. Instead, selected towns within the region would be encouraged to develop a stronger economy by improved transportation connections to each other and to larger cities. These towns would then attract persons as commuters or residents who are now moving directly to the congested ghettos of big cities.

An argument that this is a sound approach is that rural-oriented persons can enjoy a higher standard of living with a given cash income if they can supplement this income with home-grown food products. Families could live within commuting distance of towns where jobs are available but not in such crowded conditions that gardens, chicken houses, etc. are prohibited. This approach is a direct adaptation of the traditional rural way of life and is not new or untried. The new and untried part of it is that there has been very little government encouragement of this approach as a solution to both rural and urban poverty problems.

Arguments for supporting the economy of small and medium-size towns were advanced in a U. S. News and World Report article in the April 22, 1968 issue. Executives of several national firms with plants or home offices in such towns as Paris, Texas; Tecumseh, Nebraska; Boise, Idaho; Burlington, Vermont; and Colorado Springs and Loveland, Colorado were interviewed. All were

happy with locations in towns which had good transportation and communication links to other towns and cities. Advantages cited were the lack of congestion and crime of big cities, capable laborers from the surrounding countryside, and attractive outdoor recreation opportunities in several locations.

CHAPTER II

ALTERNATIVES TO CONSTRUCTION OF DEVELOPMENT HIGHWAYS

The policy of highway construction for rural economic development is only one of several policies which may be pursued for this purpose. Several other available policies will be examined briefly in this chapter. The policies which will be examined are (1) planned out-migration, (2) aid to education, (3) increased welfare, (4) investment in capital facilities, and (5) investment in natural resources. Factors favoring or opposing implementation of each policy will be discussed.

This chapter on alternative policies for public investment in rural areas is included to show that highway construction is not the only tool available to stimulate rural economic development. Other solutions to the problems do exist. Each policy has its own particular advantages and disadvantages. An understanding of these advantages and disadvantages is needed before a final policy is selected. The final policy which is selected may actually be a combination of one or more of the alternatives discussed below.

The importance of long-range policy decisions concerning the future development of a distressed area cannot be overemphasized. All reasonable policy alternatives should be investigated before any public funds are committed to a program attempting economic stimulation. For example, the policy of

encouraging the depopulation of a distressed area or of a specific remote section of a distressed area may be a wiser use of public dollars than spending millions to develop an economy which could never compete successfully with neighboring urban economies.

Planned Out-Migration

The policy of planned out-migration is one alternative which could be selected to relieve the unemployment problems of a distressed area. This policy would attempt to persuade individuals to move to locations where their skills are in demand. Planned out-migration will encourage the most efficient use of human resources in the nation's market place.

The Committee for Economic Development, made up of 200 of the nation's leading businessmen and educators, has suggested the following general principle concerning planned out-migration:

> . . . in a town or rural area where workers are paid substantially less than they could make elsewhere and a basic change within five years or so is unlikely, a shift of some of the population out of the area might be just as important to the region's economic future as efforts to promote economic activities.[8]

Factors Favoring Planned Out-Migration

In a nation where output and productivity are increasing, can every area expect to enjoy a rising level of per capita income? The answer is yes, if each area is ready to encourage and assist in a shift of population whenever its relative advantages among other areas call for such a shift.[9] All areas of the country cannot hope to experience equally rapid increases in their economic activities

but they can expect to remain out of the distressed category by encouraging their unemployed workers to move to areas of labor shortage.

This is beneficial to the nation also because over-populated depressed areas act as a drag on the national economy.

Substantial out-migration has been coupled with an effective economic development program to achieve increasing per capita income levels in Puerto Rico. This program has been in operation during the past decade and has contributed to a rise in the standard of living while maintaining the island's population at an almost stationary level.[10]

Out-migration from distressed areas can benefit both the nation and individual families. The nation benefits when our human resources are utilized at locations where net returns are highest. Individual families benefit when they can improve their living standards by moving. In fact, the ability of individual families to improve their lot by moving was most dramatic in the frontier-pioneering period of our country.

Factors Against Planned Out-Migration

A variety of personal, social, and political factors exist which tend to discourage out-migration for many workers. These include lack of knowledge about opportunities elsewhere, lack of training for a different job, familiarity with the home community, strong emotional ties with family and friends, investment in a home, and lack of funds to finance a move.

Securing a new job in unfamiliar surroundings may be especially difficult for certain groups. Workers who are unskilled, over 45, or members of racial

minorities may find job hunting difficult.

The political implications of a policy promoting out-migration deserve mention also. Politicians are not likely to support programs which result in a loss of constituents.

Implementing an Out-Migration Policy

The out-migration of workers from depressed areas can be encouraged by the following programs:

1. Job Information. State employment agencies, cooperating with the U. S. Department of Labor, could publish information in depressed areas about job opportunities in other parts of the country. This would benefit both workers and employers.
2. Assurance of unemployment compensation. Workers should be assured that their unemployment compensation will not be cut off when they move out of a depressed area and across state lines.
3. Loan for moving expense. Workers could be given a loan for moving expenses and first month's living expense when they move from depressed areas to areas of low unemployment (defined by the U. S. Department of Labor).

Aid to Education

Aid to education is a form of "investment in human resources" which should be considered as an alternative method to remedy manpower problems of distressed areas. Specifically, aid to public school education and vocational training

should receive much more emphasis in dealing with these problems in the future.

Factors Favoring Aid to Education

The Committee for Economic Development has stated that public investment in education promises the greatest relative returns when compared with other governmental measures that have been proposed for economic advancement.[11]

Investment in our human resources is necessary to develop skillful, well-equipped individuals who will be prepared for a lifetime of productive work. Persons with broader educations will be more capable of acquiring new skills and adapting to the changing needs of most occupations.

The need for education is further emphasized by the increasing requirements for higher skills as machines replace men in many jobs. During the decade 1950 to 1960 the professional and technical jobs increased by 54.1 percent while jobs for unskilled workers remained static.[12]

The pride and dignity associated with a self-supporting worker demonstrates the value of educational aid. A trained individual can say he is "making it on his own" while the untrained, unemployed welfare receiver may tend to feel like a drag on society.

Factors Against Aid to Education

To argue against aid to education for depressed areas is difficult. However, certain disadvantages or limitations should be recognized. These are listed below:

1. Cost. Educational and vocational training facilities are costly to establish, operate, and maintain.

2. Delayed impact. An educational training program usually does not have an immediate effect on a depressed area's economy. This type public aid is usually geared to the "long haul" and benefits are generally not realized until the trained persons reach the job market.
3. Limited application. Aid to education is most beneficial for that segment of the population which receives the education. The benefits are limited, however, to certain groups. These are most likely to be the young and/or educable and trainable persons. Other groups which may be neglected are the very old and mentally retarded.

Implementing Increased Aid to Education

Two basic methods are recommended for implementing a program of increased aid to education--consolidation of inefficient school districts and state/federal supplements to local funds. These methods are not new but they can be practiced in a variety of new ways. For example, federal and state funds spent per pupil in a depressed area could vary inversely with the average level of income in the area. Supplementary funds could be used to provide a better than average general and vocational education and a modern vocational guidance system.

Increased Welfare

Welfare is a broad term used to refer to a direct grant to needy persons. The amount varies according to the recipient's age, dependents, health, etc. The grant is usually in the form of a monthly "welfare check" but medical aid

and food stamps are also part of the benefits of "being on welfare." The guaranteed annual income, frequently discussed but not enacted into law, is in this category also.

The pro and con arguments discussed below will apply to an increase in welfare payments and benefits for depressed areas only, not nationwide, since the main concern here is depressed areas.

Factors Favoring Increased Welfare

The factors supporting increased welfare payments for depressed areas are:

1. Immediate benefits. There is little time lag from the moment the welfare payment is received until it is spent for the needs of the receiver. Benefits then accrue to the individual as well as the local economy.
2. Independent decisions. Welfare payments provide actual cash to the recipient. This permits him to make an independent decision in the market place to satisfy his own needs. In this way government cannot be accused of spending the public's money on goods or services which are not of direct benefit to the needy persons.
3. Administrative costs. Cash grants are economically administered. The cost of administering such a program is small compared to the two previously examined policies of aid to education and planned out-migration.

Factors Against Increased Welfare

Factors against increased welfare benefits for depressed areas all relate to

the "never ending" nature of this program. The distressed area will continue to be a handicap to the nation's productivity. Money is poured into the area from the rest of the nation but there is no return on the investment.

The argument "for" or "against" increased welfare depends on the population segment which receives the benefits. There is no intention here to discourage providing adequate benefits to the elderly, the handicapped, the orphaned, the mentally retarded, etc.

Implementing Increased Welfare

Implementing a program of increased welfare would, at its simplest, involve channeling more funds into the existing system. Certain methods of emphasizing aid to distressed areas could be tried. For example, designated areas could receive funds on a per capita basis in inverse proportion to their income levels, as was suggested in the aid to education section.

Investment in Capital Facilities

Public investment in capital facilities for a distressed area is one alternative which may be chosen to encourage economic growth. This method was used in the 1930's by the Civilian Conservation Corps (C.C.C.). We are still enjoying benefits from the dams, bridges, trails, and other projects of this program.

Investment in an area's capital facilities covers a wide variety of possibilities. Transportation, water supply, power, housing, sewers, and capital equipment for private industry are all examples. Highways are a specific example of capital facilities which will be examined in detail in the remaining chapters of

this thesis.

Factors Favoring Investment in Capital Facilities

The very nature of sound economic growth implies the existence of competitive capital facilities. Transportation, public utilities, and modern equipment are all necessary for a city or geographic region to compete with its peers. In fact, an effort to improve the economy of a distressed area is likely to produce nothing unless major attention is given to the area's capital facilities. Capital facilities act as a base on which the economy can grow.

Factors Against Investment in Capital Facilities

The principal factor against investment in capital facilities of a distressed area is that the inherent disadvantages of the particular area may be so great that no reasonable amount of public investment would make the area competitive in the private market. The disadvantages of location, resources, etc. should be carefully evaluated before public investment in capital facilities is begun. Obtaining federal grants and subsidy for home state investment may win votes for a congressman but may produce no meaningful benefits for the nation and relatively short-term, inconsequential benefits to the local area.

Implementing Public Investment in Capital Facilities

Public investment in capital facilities can be implemented in a variety of ways depending on the type and location of facility desired. Dams and other watershed control projects are frequently constructed by public utility companies, the U. S. Army Corps of Engineers, and the U. S. Department of Agriculture's Soil Conservation Service. These existing agencies could concentrate their

activities in distressed areas at locations where their particular programs are applicable.

Roads and water and sewer systems are usually financed by matching funds from federal, state, and local governments. Distressed areas can be favored if the federal share for construction of these capital facilities is significantly greater than for construction of similar facilities in non-distressed areas.

Investment in Natural Resources

Investment in natural resources is another alternative which may be used to stimulate the economy of a distressed area. Natural resources which may be developed include water, scenic areas, forests, minerals, wildlife, etc.

Factors Favoring Investment in Natural Resources

Development of natural resources can attract new industries and services to an area. Natural resources which are related to recreation and leisure time may be especially profitable for this purpose. Water and related recreation activities are frequently used as an added inducement by industries to seek professional workers.

For example, the development of natural resources for skiing has contributed to improving the year-round economy of rural mountain areas throughout the United States. Boone, North Carolina is typical of mountainous areas where resort villages have been started with skiing as the major attraction. The increased numbers of visitors during the winter months have benefited motels, restaurants, service stations, etc. Real estate values have climbed. The

construction industry is building chalets, sewers, water systems, and roads. A small airport has been constructed by one resort developer. Summer activities such as golfing, horseback riding, hiking, camping, and relaxing are being promoted to maintain year-round employment.

Development of natural resources can provide a source of raw materials for a distressed area. For example, the development of forests can provide raw materials for pulp and paper manufacturers and for the lumber industry. Careful management of forests can improve the quality and maintain a constant quantity of logs and pulpwood.

Factors Against Investment in Natural Resources

The basic argument against development of natural resources to stimulate economic growth in a distressed area is similar to that used against investment in capital facilities (i.e., the area may still not be able to compete successfully with its peers). This could only be decided through careful study before the investment is made.

Another factor concerns the political realities by which such a program of natural resource investment is likely to be administered. The funded projects may be chosen through political trade-offs rather than by an objective analysis to determine priorities.

Implementing Investment in Natural Resources

Investment in natural resources can be implemented by two basic methods for the benefit of distressed areas. The first is by governmental assistance to private enterprise in specifically designated areas where development of natural

resources is warranted. Low interest loans could be made to mining companies for modernized equipment and to resort development companies for sewer systems, water systems, roads, etc. Special incentives could be incorporated in these loans for development practices which reduce environmental pollution.

The second method of implementing a program of investment in natural resources involves governmental agencies. The U. S. Departments of Agriculture and Interior could concentrate their activities related to natural resource development in distressed areas. Specific programs could be established to clean polluted streams and restore land spoiled by strip mining.

CHAPTER III

EVALUATION OF TWO DEVELOPMENT HIGHWAY SYSTEMS IN THE UNITED STATES

Examples of specific development highways in the United States are quite limited. Only in the past few years have highways been built specifically for the purpose of stimulating a regional economy. Ordinarily, the primary purpose of highway construction is movement of traffic. However, our government's domestic poverty programs include a major development highway system which will be built for the purpose of stimulating the economy of the Appalachian Mountains area. This highway program will be discussed in this chapter.

A second example of development highways will also be examined. These are the development highways of the Upper Great Lakes Economic Development Region in the northern section of Minnesota, Wisconsin, and Michigan. These highways can be classed as development highways since they are being built to attract traffic to certain areas rather than serve existing traffic demands. However, the total program of economic development for the region is not as broad as the Appalachia project.

Appalachian Development Highway System

The Appalachian Development Highway System was authorized as a new program under the Appalachian Regional Development Act of 1965. This highway

system was one of several new programs of public investment enacted by Congress to strengthen the free enterprise economy in Appalachia.

The Act also established the Appalachian Regional Commission which was required to make recommendations to the Secretary of Commerce concerning the general location of the development highways, priorities for construction, and other criteria for the program. The consulting firm of E. S. Preston & Associates, Ltd., of Columbus, Ohio, was retained by the Commission for technical assistance. This firm made recommendations for the general highway corridor locations and development highway construction priorities.

After the Commission had determined the general corridor locations and termini for the development highways, the state highway departments were responsible for fixing the final right-of-way and actual construction. This work was subject to approval of the Bureau of Public Roads which administers federal funds for these highways just as it does for the interstate and federal-aid primary and secondary systems.

Federal assistance for construction of the Appalachian Development Highways is limited to 50 percent of the total project cost except in unusual cases where up to 70 percent may be paid.

Objectives

The most important objective of the Appalachian Development Highway System is to eliminate regional isolation. Throughout the examination of Appalachia and its conditions, the problem of regional isolation has been

recognized as the major deterrent to economic growth and development. The Commission stated in its 1964 report that, "Penetration (of the region) by an adequate transportation network is the first requisite of its full participation in industrial America."[13]

The Appalachian Development Highway System has been planned to provide, in conjunction with the interstate system and other federal-aid highways, a "highway system which will open up an area or areas with a developmental potential where commerce and communication have been inhibited by lack of adequate access."[14] It is hoped that these new highways will promote commutation to jobs and services as well as a general flow of national commerce through the region.

Specific objectives of the development highway are to open up development sites for new industrial and recreational activities. The State of North Carolina has placed a high priority on the construction of three Appalachian development highways for this purpose. These three highways will help link western North Carolina to the growing Southeastern market area.[15]

Approach

The basic approach used by the Appalachian Commission to achieve the objectives of their highway program was to submit a plan for a highway system which would create traffic. This differs considerably from the traditional approach of using traffic demand as indication of a need to create highways.

The backbone of all highway transportation in Appalachia is the Interstate Highway System. However, much of the region is not directly served by these

limited access highways. Certain areas are so removed from the interstate system that a driving time of an hour or more may be required to reach the nearest interstate highway. Other areas have an interstate highway nearby but it provides rapid travel in only two directions. Access to areas to the north and south or east and west of an interstate highway may be entirely lacking. Five of these areas were identified by the Commission:

1. An area at an intersection of Georgia, Tennessee, and North Carolina.
2. An area at the intersection of southeastern Kentucky, southwestern Virginia and West Virginia, and northeast Tennessee.
3. West Virginia and the area of its intersection with Maryland and Pennsylvania.
4. Central Pennsylvania.
5. The Cumberland Plateau area of Tennessee.[16]

The Appalachian Development Highway System was designed to provide access to these isolated areas. Rather than up-grade and expand the most heavily traveled routes, the new highways seek to stimulate the flow of people and goods to and through remote areas which have a developmental potential. It is hoped that the highways will release this potential by opening up areas where commerce and communication of people with people have been inhibited by lack of ready access.

Appalachia's development highways are one part of a public investment program which is being used to stimulate growth of certain key communities.

The highways will link these key communities to each other and to the rest of the nation. Facilities to improve the education and health of the people will be concentrated in these communities also. Other recommendations for improvements were made concerning airports, water resources, agriculture, timber, minerals, power, recreation, vocational rehabilitation, employment services, nutrition, housing, and community development.[17]

This policy of concentrating public investment in key growth centers is being followed by the Appalachian Commission in an effort to bring the population distribution of Appalachia more nearly into balance with that of the rest of the country. It probably would be impossible, and would certainly be economically unsound, to try to stimulate economic activity in all of the villages and hamlets which dot the Appalachian Region.

The Appalachian Regional Development Act of 1965 authorized a total of $1,092,400,000 in federal funds to be spent for economic development of the Appalachian region. This total was divided among the various programs as follows:

Program	Amount	Percent of total
Appalachian Regional Commission Operating Expenses	$ 2,400,000	0.2
Health Centers	69,000,000	6.3
Land Conservation	17,000,000	1.6
Timber Development	5,000,000	0.5
Water Resources Survey	5,000,000	0.5
Vocational Education Facilities	16,000,000	1.5
Sewage Treatment Facilities	6,000,000	0.6
Supplement Existing Federal Programs	90,000,000	8.2
Establish Local Development Districts and Research and Demonstration Projects	5,500,000	0.5
Highways	840,000,000	76.8
Mining Restoration	36,500,000	3.3
Total	$1,092,400,000	100.0

The highway program comprised the largest portion of the recommended federal investment because in the view of the Appalachian Regional Commission, "The remoteness and isolation of this region, lying directly adjacent to the greatest concentration of people and wealth in the country, is the very basis of the Appalachian lag."[18] It was determined that a massive highway program would be necessary to reduce the effects of this remoteness and isolation.

Decision-making in the Appalachian Development Program is the responsibility of the Appalachian Regional Commission. This Commission consists of the governor of each state making up the region and a federal chairman appointed by the President. The governors select their own co-chairman and rotate the position every six months. Formal actions require the affirmative vote of the federal co-chairman and a majority of the state members. Program and project proposals may not be brought before the Commission for action unless they have been approved by the appropriate state member.

Projects approved by the Commission are recommended to the appropriate federal department which has responsibility for final approval and implementation of the project.

The decision to build highways and the subsequent decisions of corridors and amount of federal money recommended for highway construction was made by the Commission. The final route locations were selected from various alternatives within the recommended corridors by the state highway departments after approval by the Bureau of Public Roads. A method used by a consultant to the Kentucky

Department of Highways to test alternative alignments within a general corridor is included in the appendix of this thesis.

The real test of Appalachia's development highways is how well they bring the people into the economic mainstream of America. Naturally, the success or failure of this test can never be credited totally to the highways because of the variety of other public investments in the Appalachian program. However, the highways received initial attention by the Appalachian Regional Commission so a limited evaluation may be made of segments of the system which have been opened.

One of the few segments of the development highways which have been completed connects Interstate Route 64 and Lexington, Kentucky with the mountain areas of eastern Kentucky. This highway has stimulated much commerce and commutation between Hazard, Kentucky and job centers to the north. In fact, the political leaders of Perry County, Kentucky and Hazard have reported to the Appalachian Regional Commission "that this highway has been the greatest economic event that has occurred in that region in thirty years."[19]

The proposed system of Appalachian Development Highways may be evaluated in a superficial manner by superimposing them on a map of the region showing the Interstate Highway System (see map in Appendix). In this way it can be seen that much of the regional isolation will be reduced. For example, the mountainous area of north Georgia and the extreme western tip of North Carolina will have much improved access to Asheville, Atlanta, and Chattanooga. Also, eastern Kentucky will, for the first time, have easy access to the Lexington, Louisville, and Cincinnati areas.

A method for evaluating the Appalachian Development Highways after the system is more complete has been proposed in the Highway Research Circular of July 1966 (see reference by Ralph E. Rechel in "Other References" section of Bibliography). This study would be broader than has been used for any previous highway study. It would attempt to quantify benefits to the entire region. Briefly, the method proposes collection and evaluation of data concerning:

1. Benefits to base load traffic (existing plus projected traffic with no highway improvements),
2. Benefits from generated and diverted traffic, and
3. Benefits from tourism and recreation.

No record is available of major policy alternatives which may have been evaluated by the Appalachian Regional Commission in their procedure of selecting the recommended program.

The major criticism of the entire Appalachian Development Program is that too much money was allocated toward maintaining the existing and increased levels of population in the region. Critics say it is unrealistic to think that the region can compete successfully with the major cities along the eastern seaboard and Great Lakes and that more emphasis should have been placed on encouraging the younger generation to seek opportunities outside the region.

Upper Great Lakes Economic Development Region

The Upper Great Lakes Economic Development (UGLED) Region consists of the northern parts of Minnesota, Wisconsin, and Michigan. This area was designated

as an "economic development region" under authority of the "Public Works and Economic Development Act of 1965" as passed by the U. S. Congress.

The Upper Great Lakes Regional Commission was created to perform long-range economic planning so the region would be eligible for federal financial assistance for economic development under the provisions of the Act. This Commission asked the highway departments of the three states to jointly prepare a highway plan which could be used as part of an over-all economic development plan for the entire region. This plan was completed in April of 1967.

Objectives

The most important objectives of the UGLED Region's highway plan involve reducing the travel times between its natural resources and the population concentrations to the south, such as Chicago, Detroit, and Milwaukee. Two objectives have been outlined which depend on the reduction of these travel times. The first of these is to improve access between areas of industrial potential in the UGLED Region and the market to the south. This market is the nation's vast manufacturing belt which extends from New York and Boston westward to Chicago and St. Louis. The industrial potential which the UGLED Region is depending on is based on its mining and forestry industries.

The second objective which is dependent upon travel times is to increase accessibility to the recreation areas of the Region from the same population concentrations to the south. Much emphasis is placed on the recreational potential of the UGLED Region; this will be discussed further in the next section.

The other objectives of this highway plan concern improving the highway

facilities within the Region. More specifically, they have been stated as:

1. Serve regional institutional development by linking secondary schools, vocational schools, hospitals, etc., and their planned access areas.

2. Serve regional urban centers so that their special urban services will become more accessible to outlying communities and rural population.

3. Promote regional industry and commerce by connecting different levels of trade centers.[20]

Approach

The basic approach of the UGLED Region's highway plan is to propose a system of limited access highways between the northern parts of the three states and their southern population centers. As these highways reduce travel times to northern locations, it is hoped that the natural resources of the Region will be more fully utilized.

One natural resource which the UGLED Region is placing much emphasis on is outdoor recreation. The area is blessed with millions of acres of public lands and waters, natural scenic features, uncrowded space, and pleasant summer temperatures. The existing summer and winter resorts which are located near the southern edge of the Region have experienced increasing business in recent years.

Limited access development highways could make the recreation facilities much more accessible to the growing metropolitan centers south of the UGLED Region. For example, Lake of the Woods in Northern Minnesota is about 800 miles or two days by automobile from Chicago on existing highways. By limited access highways this distance could possibly be covered in one day.[21]

The UGLED Region's highway development plan states that each highway project should be evaluated according to two criteria. These are:

1. The project must contribute to the economic development of the Region by promoting industrial, commercial, agricultural, or tourist activities.
2. The project cannot be accelerated with currently available revenue.[22]

These and other more specific criteria will be used to establish priorities as money becomes available for construction.

Decision-making in regard to developmental projects in the UGLED Region is similar to that followed by the Appalachian Regional Commission. The essential difference in regard to highways is that the highway recommendations were made jointly by the highway departments of the three states rather than a commission staff or consultant.

The highway plan prepared by the three state highway departments recommended a "Backbone Highway System" or system of major highways for the three states. This system was selected after an analysis was made of the future highway needs of the three states from 1967 to 1985. The traditional method of traffic projection based on population, vehicle registrations, and travel increases was combined with an analysis of the recreational and industrial potential of the UGLED Region to produce the recommended highway system.

Highway needs studies conducted by the three states show a combined financial deficiency of $4.4 million for the period 1965-1985 for the entire

Backbone Highway System. Anticipated revenue was based on a continuation of federal aid at present levels except for the Interstate funds which are scheduled to terminate in 1972. A major point of the UGLED Region's report was that additional funds are needed for highways to permit the recreational and industrial potential of the area to be realized.

CHAPTER IV

SELECTING LOCATIONS FOR DEVELOPMENT HIGHWAYS

Selecting the most appropriate locations for development highways depends on a careful examination of the region to be served. This chapter will review the factors which should be considered when such an examination is made. The first factor to examine is the accessibility, or lack of accessibility, provided by existing roads. A second consideration is whether or not the present and potential future economy of towns in the region warrant a new highway. A third, the stimulation of tourist/recreation centers by highways will be considered. Fourth, the role of highways in stimulating the development of natural resources will be examined.

The concept of planning a network of highways rather than specific links should be held constantly in mind by the regional planner. The network should focus on the larger growth centers with connections to local service centers and neighboring metropolitan centers. Wholesaling and distribution firms are especially dependent on an efficient highway network since they seek to minimize the cost of transporting goods to and from their point of operation.

The provision of extra-regional linkages from the rural region to neighboring urban centers can provide benefits to both areas. The benefits to the rural region include more accessible jobs, increased markets, and a multitude of other

advantages associated with proximity to urban centers. The metropolitan area benefits by having additional open space available for a variety of purposes and a new source of laborers.

Identification of Areas Outside the Influence of Interstate Highways

The first step when selecting locations for development highways in a region is to examine the Interstate Highway System and determine which areas need additional high speed highway service. The Interstate System provides the first high-speed traffic facilities into and through most regions of the United States. This system links the major population centers of the nation but bypasses many areas that still do not have reasonable access to a freeway.

A measure of reasonable access to a freeway is a unit of time. It has been found that many drivers will use a freeway for a portion of their trip even though the freeway route involves a greater distance than the non-freeway route when the travel time is nearly equal. In order to show the accessibility of the Interstate Highway System, a driving time should be chosen which would represent a reasonable time of influence to use the Interstate route versus an alternate route. A driving speed on highways which interchange with the Interstate System should be determined from local conditions. Then the simple multiplication of the speed and time will yield the distance from the Interstate Highway within which reasonable access is provided. The distances may then be plotted as a time contour line on a map and the areas which do not have reasonable access to the Interstate System can be easily recognized.

It is natural that short and long trips are influenced differently by the distance to an Interstate Highway. A driver beginning a long trip will drive a greater distance to reach the Interstate Highway than will the driver beginning a short trip. For this reason, the definition of an area beyond reasonable access to an Interstate Highway must be stated in approximate terms only.

The consultant for the Appalachian Regional Commission used a driving time of thirty minutes and assumed a driving speed of fifty miles per hour. This yields a distance of approximately twenty-five miles from the Interstate System which was plotted on a map as a time contour to separate those areas having reasonable access from those areas not having such access.[23]

Automobiles may be driven onto an Interstate Highway only at interchanges. For this reason, Interstate Highways have maximum influence on adjacent land use and traffic at interchange locations. Land which is adjacent to an Interstate Highway or roads which cross an Interstate Highway will not have immediate access to the highway whenever an interchange is not nearby. This information will be indicated by the time contour lines.

The local topography deserves careful consideration when plotting the time contours. Lakes, mountain ridges, rivers, etc. may act as physical barriers to automobile travel.

The concept of accessibility which has been outlined above is recognized in Great Britain as indicated by the following excerpt from the April 1965 issue of the British Road Federation Bulletin:

> In studies of future needs the Government will not lack for reference points. The County Surveyors Society, working on the premise that travellers should be able to reach a motorway within 20-25 miles of their starting point and continue on it to within the same distance of their destination, has put forward proposals for an extended road system which call for an additional 1,700 miles of highways over and above the Government's present plans.[24]

Criteria for Evaluating Potential Growth/Employment Centers

Identification of potential growth/employment centers which may be chosen as locations for development highways requires a review of the economy of communities with an emphasis on potential for future growth. The factors to consider when making this review will be discussed below. These factors include sensitivity to the business cycle, economic stability, linkage potential, scale, seasonality, diversification, relation to regional and national trends, and resources and services.

Indicators of a community's economy such as population, income, and employment will not be discussed in detail. These indicators should be reviewed, however, and communities experiencing a substantial growth in population, income, or employment despite a decline in nearby communities are worthwhile candidates for a development highway.

Sensitivity to the Business Cycle

A community's economy is said to be "sensitive" if regional or national economic activity quickly and severely affects the local economy. For example, an economy based on the production of luxury items or durable goods such as furniture, transportation equipment, or fabricated metal would be depressed by a

downswing in the national economy. Producers of high-priced goods may even go out of business during a depression. An economy based on the production of non-durables and low-priced goods is less sensitive to economic trends and may actually improve during a depression.

Economic Stability

Economic stability refers to the ability of a community's economy to withstand cyclical variations in economic activity. These variations may be seasonal cycles or short-span, non-seasonal business cycles.

Seasonal cycles are more subject to local control than other business cycles because their origin is usually local rather than national. Non-seasonal business cycles are frequently part of a national business cycle and cannot be controlled by local policies.

In addition to cyclical changes, stability refers to the way a local economy may react to a sudden change in any one activity within that economy. In general, a local economy consisting of several equally strong basic activities is more stable than one which is dependent on a single major activity. A community whose total economy is based on a military installation, for example, may not be stable because a shift in military needs could result in abandonment of the installation.

Linkage Potential

Linkage potential refers to interrelationships between firms in which a given firm acts as supplier to, or consumer of, products and by-products of another. These interrelationships include using by-products to make new products, using

parts from several sources to assemble a complete product, using the same locally processed raw material as other firms, or performing one of a series of successive processes on a product.

Industrial linkages permit efficiencies in producing a product as well as in obtaining qualified workers. Workers develop skills which may be useful in several industries where linkages exist. Also, workers may begin their careers in relatively low-skill jobs and progressively work toward higher-skilled jobs where the jobs have similarities due to industrial linkages.

Communities where industrial activities are linked or where new industrial activities could develop linkages to existing industries may be desirable locations for development highways. The highways could assist linkage development by reducing travel times for goods and workers.

The over-promotion of industrial linkages is not always wise, however. This could cause the economy to become unstable by being unusually sensitive to declines in any single industry.

Scale

Scale refers to a quantitative measure of economic activity. Typical measurements of the scale of activity are the total volume of employment and total payroll within a community.

Certain benefits may accrue to a community by increasing the scale of economic activity. Increasing the scale by increasing the number of firms can contribute to economic stability. Greater scale can also encourage the

development of industrial linkages which may lead to further growth. Also, there is a tendency for per capita income to rise as scale increases.[25]

Valid criticisms can be made of an economic development program which concentrates on increasing the scale of activity without recognizing the potential faults of such a program. The main fault of emphasizing scale is that quality may be sacrificed for quantity. As an example, an over-emphasis of manufacturing or another single activity may lead to instability or may aggravate instability that was already present.[26]

Seasonality

The seasonality of a community's economy refers to any regular variations in economic activity during the year. Does unemployment increase during winter months, for example?

Several steps which may be taken to reduce seasonal fluctuations include:

1. Schedule production in advance of orders,
2. Add new products which can be produced during slack seasons with available equipment,
3. Encourage customers to buy and stock out of season,
4. Dovetail employment of one establishment with another whose seasonal fluctuations are not coincident, and
5. Attract new activities which will have minimum seasonal fluctuations.

Diversification

Diversification refers to the variety of activities in a local economy. The purpose of diversifying a local economy is to obtain such a variety of industrial activities that declines in any one will only slightly affect the community's entire economy. A well-diversified economy will usually give preference to low-unit-price, consumer non-durable goods as opposed to high-unit-price producer durables.[27] Diversification improves the stability of a local economy by making it less sensitive to seasonal changes or other unexpected business declines.

Relation to Regional and National Trends

Regional and national trends may affect the present and future economy of communities in distressed areas in a variety of ways. A local community's economy may be dependent on a nationally declining industry, for example. Or a local industry may be experiencing a geographical shift away from the area. The increased popularity of skiing is a national trend which has benefited several economies in the Appalachian region in the past few years.

Resources and Services

A review of a community's resources is useful in determining the community's potential for economic growth. Resources which are necessary for substantial industrial development include (1) suitable land, (2) suitable transportation facilities, (3) adequate labor supply, (4) proximity to raw materials, and (5) adequate community facilities for providing necessary goods and services.

Non-commodity producing services involve resources within a community which are needed for expanding and attracting basic industry. The non-commodity producing services include (1) local consumer services such as housing, schools, stores, and local transportation and (2) business services such as commercial transportation (with adequate parking terminals), printing firms, and banking facilities.[28]

Local banking and financial services deserve careful investigation. For example, are the bankers cognizant of the needs of their economy and do their policies reflect a desire to satisfy these needs?

The services and facilities of a community's local government also provide a strong indication of the potential for economic growth. Does the community provide adequate water and sewage facilities, medical facilities, good police and fire protection, effective planning and zoning, etc.? Is the local government's financial position sound? Are any major bond issues for capital improvements anticipated?

Rural areas are typically seriously deficient in employment in services. Even though a rural area may have its share of manufacturing, it may show relatively slow growth. This is particularly true in labor intensive industries where the value added per worker is below the national average.

This is an urbanizing nation where employment is shifting to service jobs in urban centers. Service employment accounts each year for a larger share of the national employment (60 percent in 1960).[29] If predominately rural regions are

to capitalize on this trend they must strengthen selectively the growth centers which are most likely to increase in service employment on the basis of performance, location, and potential.

Identification of Potential Tourist/Recreation Centers

The use of development highways to stimulate centers of tourism and recreation has a variety of advantages and disadvantages. These should be carefully understood before public highway funds are expended for this purpose.

The benefits of a recreation industry may be limited unless it is developed as part of a broader economy. This is because tourism may be a seasonal activity and wage rates may be low.

Despite these disadvantages, a rural region with a recreational and tourist potential should carefully promote this development to complement the regional economy. Development highways may be used to serve recreational facilities which are soundly financed and provide year-round activities. For example, the new resort areas in Appalachia have been mentioned which will offer skiing in the winter and golfing, fishing, horseback riding, etc. in the summer months.

The increasing affluence, leisure time, and automobile usage of Americans are all interrelated and indicate a growing demand for recreational facilities. The regions which can provide the best of these facilities have a competitive advantage for attracting industries which could choose a variety of locations.

The use of development highways can also help solve a recreation problem by improving the accessibility of facilities which are underused due to poor roads.

Identification of Potential Natural Resource Centers

Rural regions may have a variety of natural resources which could be developed competitively with other production areas. The development of such resources as coal, oil, gas, limestone, clay, or timber may depend on adequate roads and bridges. An inventory of such resources should be made, as well as an investigation of potential markets and laborers.

Proximity to markets is quite important in the development of natural resources. The transportation costs of hauling heavy resources to markets may be so great that the resource is not commercially useful. This is true of many mineral resources in the western part of the United States.

CHAPTER V

CONCLUSION

The construction of development highways is one of several steps which could be initiated to stimulate the economy of a distressed area within the United States. Other steps such as planned out-migration and increased aid to education may be cheaper and produce greater benefits per public dollar spent. However, a specific policy of planned out-migration may be politically impossible to promote. Aid to education will likely result in an out-migration of the most capable persons while the proportion of less capable continues to mount.

The actual determination of whether a system of development highways is suitable for a specific distressed area depends on the location of the area and the complementary programs which are planned and implemented to aid in economic development. If the distressed area, or portions of it, are located relatively near a growing urban area, development highways may be used successfully to improve communication and commerce between the two areas. The distressed area can share in the wealth of the city and become a part of its area of influence when the two are connected with properly designed and planned highways.

Other distressed areas may not be located near a growing urban center. Highways can be used to stimulate the economy of these more remote areas by serving communities which have a potential for growth. Development highways

play a key role in the economy of these communities by improving the accessibility of markets, raw materials, and labor. Industry frequently favors rural communities for the following reasons: cheaper land; fewer big city problems such as strikes, crime, and air pollution; accessibility to outdoor recreation for employees; and availability of easily trained laborers.

The complementary programs which are developed (in addition to highways) to promote the economy of a distressed area are most important. Highways cannot do the job alone. Other public investments in education, vocational training, health facilities, and/or housing are necessary in a severely depressed area.

The concept of locating a highway in a certain community and following a specific alignment so the general public will receive the maximum benefits need not be restricted to designated "development highways." This concept can be applied to the planning of all highways.

No complete system of development highways is available on which conclusions can be drawn concerning the wisdom of this type of public investment. However, the information available indicates that highways are suitable for stimulating the economy of distressed areas if (1) the highways make the area accessible to one or more urban growth centers; or (2) raw materials, labor, and markets are made accessible to new growth centers; and (3) a complementary program of aid to education, vocational training, health facilities, and/or housing is implemented in addition to the highway system.

APPENDICES

APPENDIX A

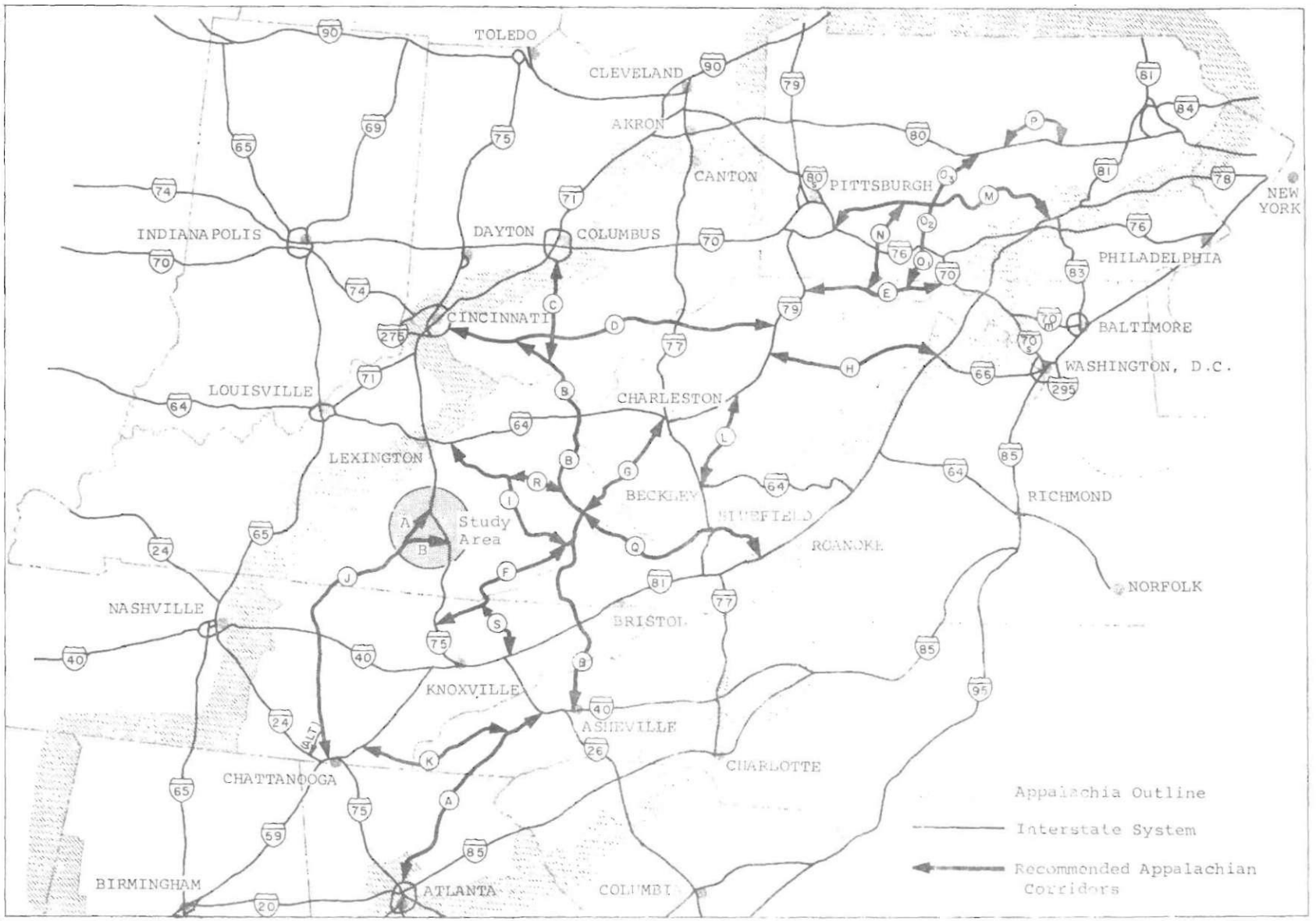
A QUANTITATIVE METHOD OF COMPARING ALTERNATIVE DEVELOPMENT HIGHWAY ALIGNMENTS

The final process involved in selecting the location of a development highway before engineering plans are prepared is a comparison of two or more alternative alignments. Such a comparison is presented in this Appendix. It was used by a consultant (Spindletop Research Center, Lexington, Kentucky) to the Kentucky Department of Highways to evaluate two alternative termini for one of the Appalachian Development Highways.[30]

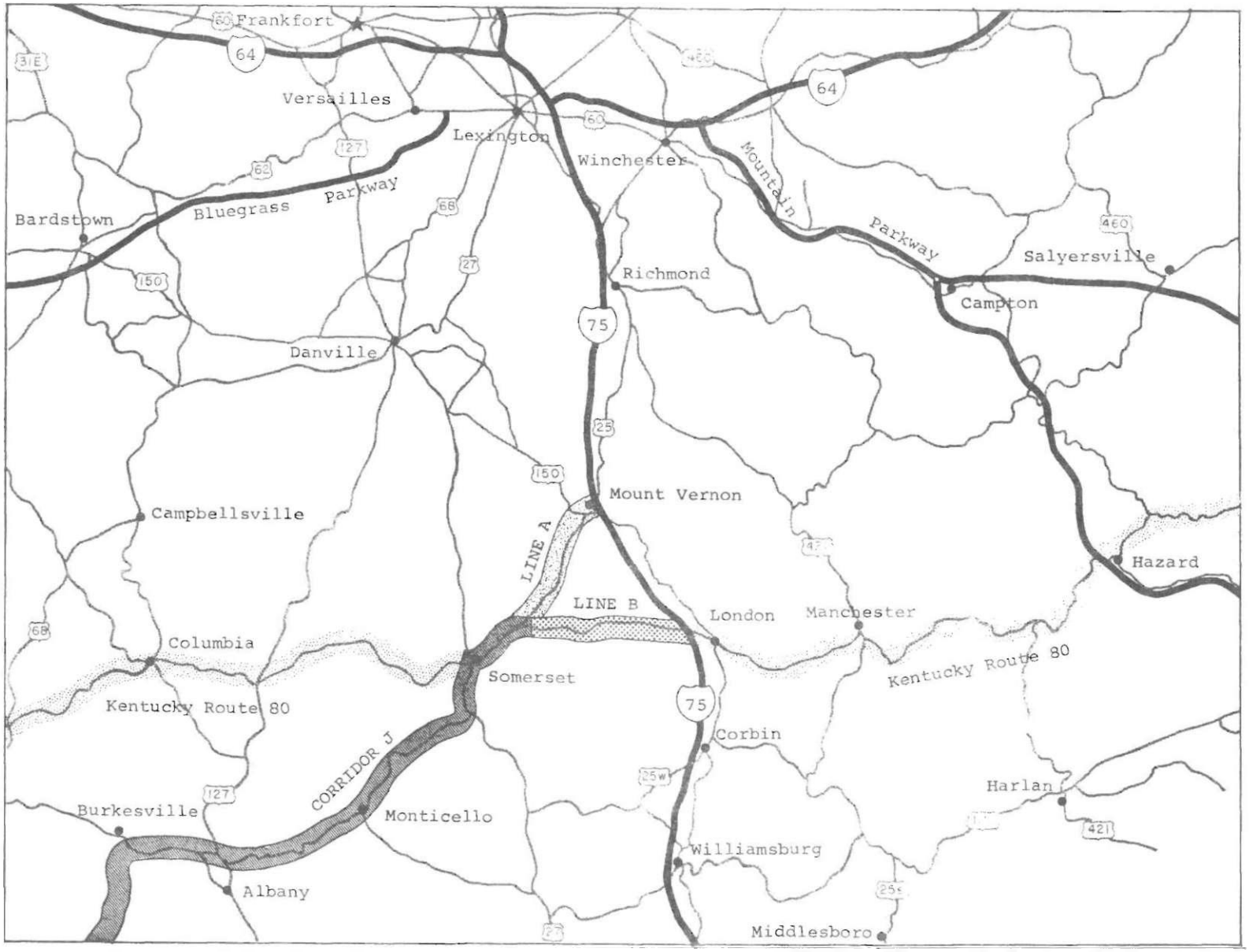
The location of the alternative alignments is approximately 80 miles south of Lexington in the vicinity of London, Somerset, and Mt. Vernon, Kentucky (see maps on the following pages). This study area is at the northern end of Appalachian Development Highway Corridor J which extends southward to Chattanooga. The alternative routes, Line A and Line B, begin at a common point near the junction of Kentucky Route 80 and Kentucky Route 461, about eight miles northeast of Somerset, Kentucky. Line A extends 18.9 miles northeastward from this point to a junction with I-75 near Mt. Vernon, Kentucky. Line B extends 23 miles eastward to I-75 near London, Kentucky.

The following method of evaluating alternative alignments considers the costs and benefits of each route. Major emphasis is given to evaluating the

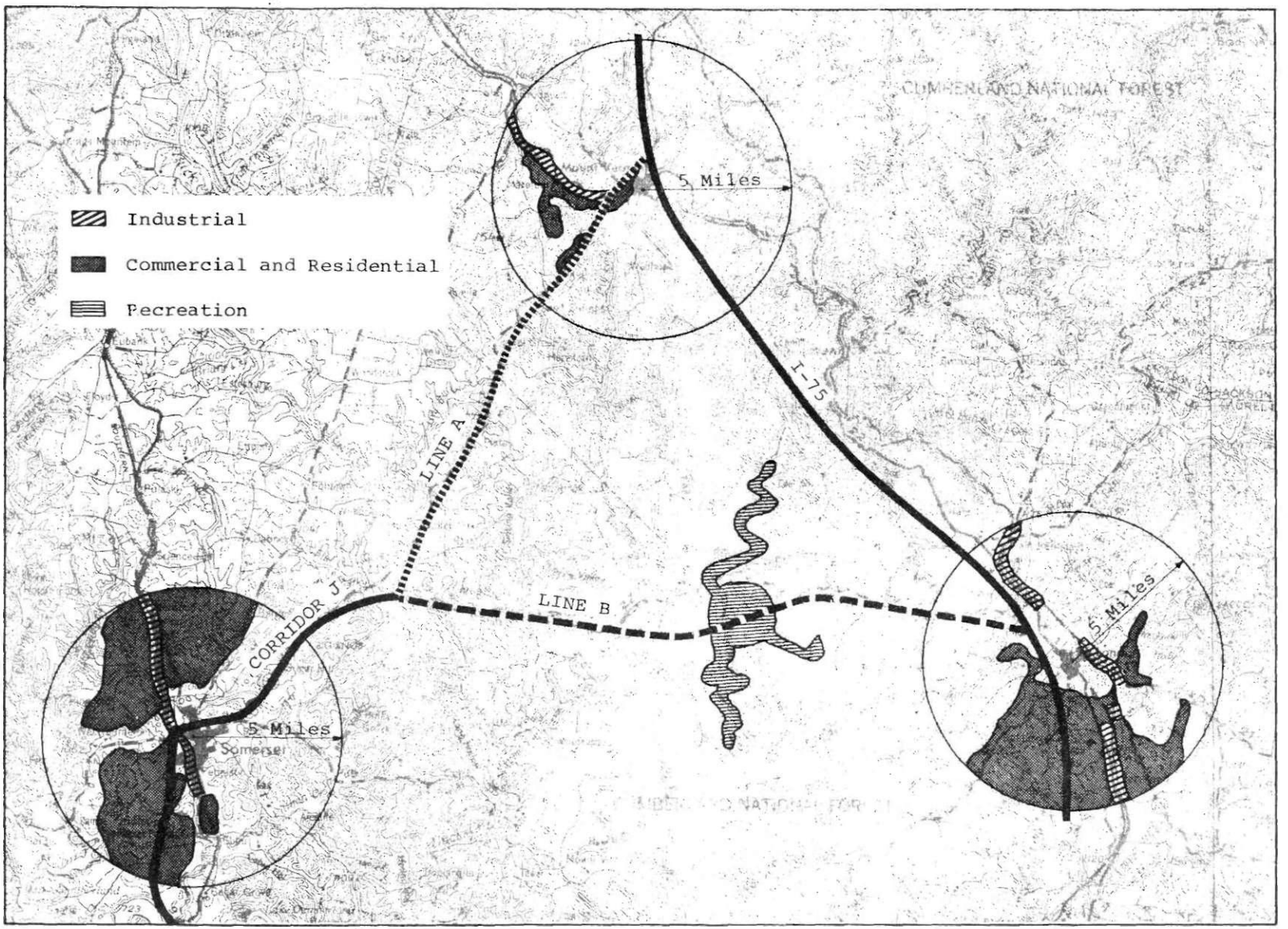
developmental benefits since the concept of economic development is the purpose of the Appalachian Development Act of 1965.



The Study Area In the Context of the Interstate and Appalachian Development Highway Systems.



Corridor J and Related Highway Network.



Corridor J Potential Growth Areas.

Methodology

The method developed by Spindletop Research to evaluate the two alternative routes considered (1) construction and maintenance costs, (2) user benefits, and (3) developmental benefits. It was a comparative analysis of the relative benefits resulting from each route. The relative values were used because of the difficulty and expense in determining absolute (monetary) values. The various costs and benefits were quantified by using relative comparisons except in cases such as construction costs where the absolute value may be estimated. These numerical comparisons were then combined in a formula to determine the overall comparison of one route to another.

The developmental benefits were compared first and combined in a formula which produced a numerical comparison of these benefits for one route vs. the other. The comparative potential for benefits from development in the following areas were estimated:

1. Industry,
2. Agriculture and mining,
3. Recreation,
4. Residential, and
5. Commercial.

Weights were assigned to each developmental benefit according to the consultant's interpretation of the goals of the Appalachian Program. These weights can be easily changed to determine the effect of a different interpretation.

The following formula was used to combine the comparisons of developmental benefits for each route:

$$D = f_1 i + f_2 a + f_3 r + f_4 h + f_5 c \qquad (1)$$

Where: D is the ratio of developmental benefits of one route vs. another; i, a, r, h, and c are the estimated ratios of development benefits for industrial, agricultural and mining, recreational, residential, and commercial development; $f_1 \ldots f_5$ are weighting factors.

After the overall comparison of developmental benefits was determined, a second formula was used to combine these benefits with a comparison of construction costs and user costs for each route. This formula is as follows:

$$R = g_1 C + g_2 U + g_3 D \qquad (2)$$

Where: R is a numerical comparison of one route to another; C, U, and D are ratios expressing a comparison of construction and maintenance costs, user costs, and developmental benefits for each route; g_1, g_2, and g_3 are weighting factors expressing in a numerical way the policy decision for giving greater importance to one type of benefit.

Developmental Benefits

The developmental benefits were analyzed in terms of specific benefits for industry; recreation; agriculture, mining, and forestry; and commercial and residential development. The evaluation included both the impact on resources immediately adjacent to the proposed rights-of-way and the larger regional impact on the area's development potential. The specific characteristics of each route which contributed to a decision regarding one route's potential vs. another are discussed in the following subsections.

Industrial Development

The consultant found that Line A would provide additional north-south access to Somerset and Mt. Vernon. Both areas would be served with generally adequate north-south highway facilities after completion of I-75, however. Line B was found to provide important improvement in inadequate east-west highway access to Somerset and London, Kentucky, two towns which had recently exhibited signs of economic growth. The planned improvement of Kentucky Route 80 east of London and west of Somerset would further facilitate east-west commerce and enhance the growth potential of both towns. Both Somerset and London were found to possess several promising industrial sites with sizable acreages of level land, highway access, and rail siding. These two towns had also made industrial development efforts at the local level and both were found large enough to provide a variety of goods and services attractive to industry.

The consultant decided that the factors described above indicate Line B would have approximately four times as much beneficial impact for industrial development as would Line A. The value assigned to Line A based on its potential for aiding industrial development was 0.25 or 1/4, and for Line B the assigned value was 4, or 4/1.

Recreational Development

It was found that Line A would benefit recreational development by providing travellers with direct north-south access to I-75 from Appalachian Highway Corridor J. Line B was found to provide opportunities for the development of recreation facilities directly adjacent to the right-of-way. Due to the great potential for recreational development in southern Kentucky, Line B was considered as an aid in the development of Kentucky Route 80 as an important east-west tourist route across southern Kentucky.

Line B was considered twice as beneficial for recreational development as Line A. The potential value for recreational development assigned Line A was 0.5, or 1/2; for Line B the value was 2.0, or 2/1.

Agriculture, Mining, and Forestry Development

Line A traverses an agricultural area and would provide benefits to nearby farmers by providing an improved farm-to-market route. In conjunction with the improvement to Kentucky Route 80, Line B was expected to stimulate the development of mineral, forestry, and agricultural resources within a broad belt. Also, Line B was expected to provide improved access to mineral and forest resources adjacent to the right-of-way.

Although Line B appeared to possess a slight advantage, the two routes were judged to have approximately equal developmental impact on agriculture, mining, and forestry. Both routes were assigned a value of 1 for agriculture, mining, and forestry development.

Residential and Commercial Development

Line A was found to traverse a greater amount of flat land suitable for commercial or residential development than Line B. Most of the level land, however, was located far from utilities and services provided by urban areas. Line B had much less flat land than Line A, but it did connect two towns with proven growth potential and the small amount of flat land was near London where development is likely to occur.

Lines A and B were judged equal in their potential for commercial and residential development and were assigned values of 1 for this type of development.

Construction and Maintenance Costs

Construction costs were estimated for each route and found to be $12,037,000 for Line B and $6,963,500 for Line A. The difference was primarily due to the higher grading and draining costs resulting from the rougher topography of Line B.

Maintenance costs were estimated for a period of twenty years, discounted to present worth, and found to favor Line A by less the $100,000. This was not a significant amount when compared to construction costs, user benefits, and developmental benefits.

The ratio of costs for Line B vs. Line A was found to be 0.6 to 1.0. Therefore, Line B was given a value of 1.0/0.6, or 1.67, in formula (2).

User Benefits

Projections of average daily traffic until 1990 made by the Kentucky Department of Highways were used to evaluate user benefits. Line B was found to offer the greatest user benefits because of its higher projected traffic count. The ratio of Line B to Line A, in terms of average daily vehicle miles, was 1.74 to 1.0. Therefore, Line A was given a value of 1/1.74, or 0.57, and Line B a value of 1.74/1.0, or 1.74.

Quantitative Evaluation

The individual relative values for the several benefits and costs of each route were combined by using the formulas (1) and (2) above and a weighting procedure which expressed the goals of the Appalachian Development Program.

Weighting the Variables

The consultant determined that the road selection should be based primarily on developmental benefits within Appalachia rather than construction savings or user benefits.

The potential for both industrial and recreation/tourism development was found to be particularly high in the study area. Both activities represent basic sectors of the economy and tend to channel income into the area from outside. Therefore, the potentials for both industrial and recreation/tourism development

were given weights of 0.4, or 40 percent, in formula (1), which combines the various types of developmental benefits.

The potential for agriculture, mining, and forestry was given a weight of 0.1, or 10 percent, in formula (1). These are basic economic activities but the study area's potential in these sectors was determined to be much lower than in recreation and industry.

The potential for commercial and residential development was given weights of 0.05, or 5 percent, each since both of these are heavily dependent upon development of the basic sectors.

The developmental benefits were given a combined weight of 0.6, or 60 percent, in formula (2). This weight was chosen because the Appalachian Development Highway System was brought into existence primarily to aid the economic development of Appalachia. Construction and maintenance costs and user benefits were each assigned a weight of 0.2, or 20 percent, in formula (2).

Combining the Variables

The values and weights were combined for each of the two routes as follows:

Line A Formula (1) was used first to combine the developmental benefits:

$$D_A = 0.4(0.25) + 0.1(1) + 0.4(0.50) + 0.05(1) + 0.05(1) = 0.50$$

The numerical value of D_A is 0.50. This represents the ratio of all developmental benefits for Line A vs. Line B.

Then formula (2) was used to combine the ratio of developmental benefits with the ratios of construction and maintenance costs and user benefits:

$$R_A = 0.2(1.67) + 0.2(0.57) + 0.6(0.50) = 0.748$$

Therefore, the ratio of overall benefits for Line A to Line B is 0.748.

Line B The same procedure as above was followed for Line B.

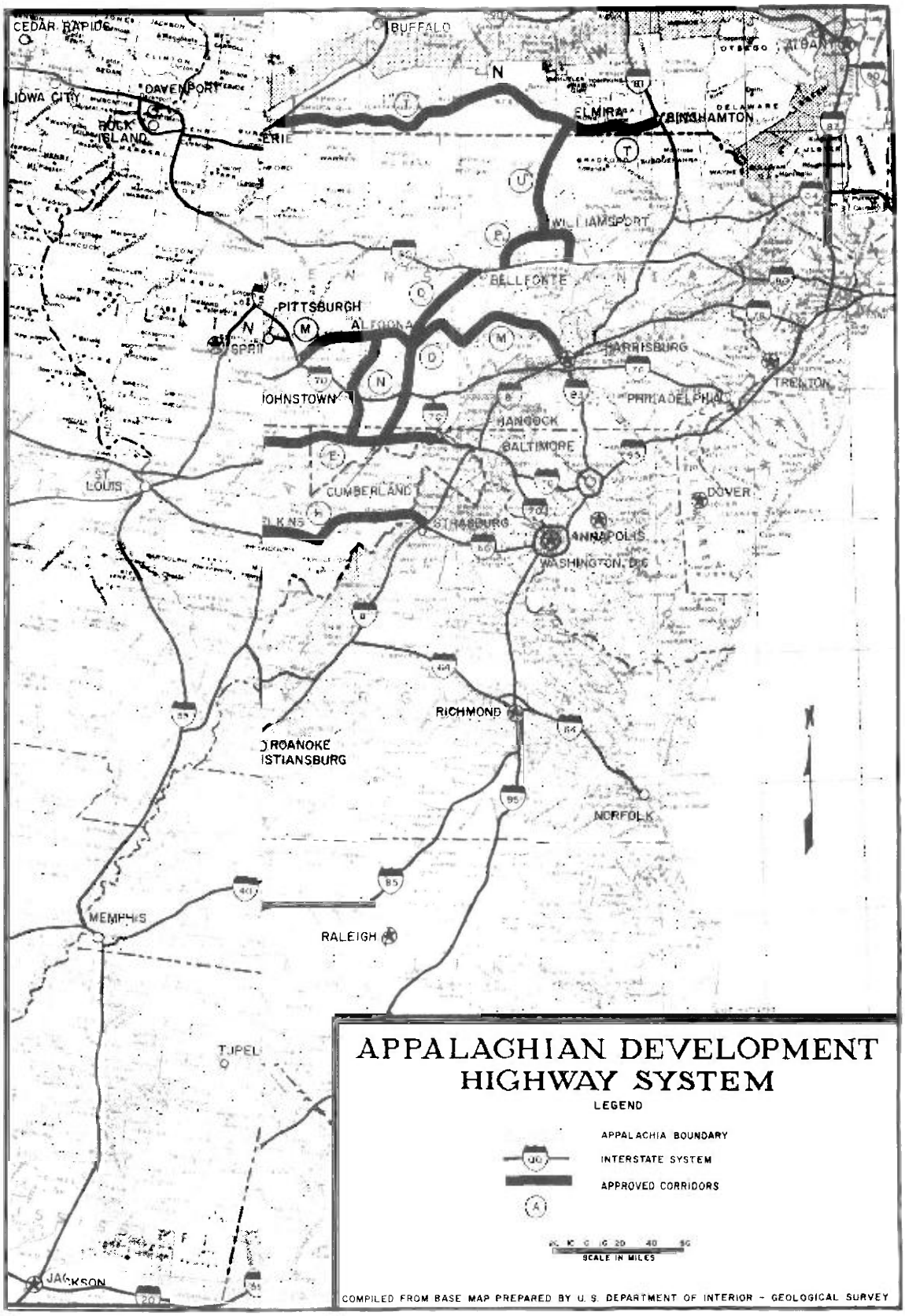
$$D_B = 0.4(4) + 0.1(1) + 0.4(2) + 0.05(1) + 0.05(1) = 2.60$$

$$R_B = 0.2(0.6) + 0.2(1.7) + 0.6(2.6) = 2.02$$

Conclusion The ratio of overall benefits for Line B was greater than for Line A. This means Line B was more consistent with the goals of the proposed construction as expressed by the weighting factors. Therefore, Line B was recommended for construction.

APPENDIX B

MAP OF
APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM


CEDAR RAPIDS
IOWA CITY
DAVENPORT
ROCK ISLAND
BUFFALO
ERIE
ELMIRA
BINGHAMTON
WILLIAMSPORT
BELLEFONTE
PITTSBURGH
ALTOONA
JOHNSTOWN
HARRISBURG
PHILADELPHIA
TRENTON
HANCOCK
BALTIMORE
CUMBERLAND
ST. LOUIS
DOVER
ANNAPOLIS
WASHINGTON, D.C.
RICHMOND
ROANOKE
NORFOLK
MEMPHIS
RALEIGH
TUPELO
JACKSON
APPALACHIAN DEVELOPMENT
HIGHWAY SYSTEM
LEGEND
APPALACHIA BOUNDARY
INTERSTATE SYSTEM
APPROVED CORRIDORS
SCALE IN MILES
COMPILED FROM BASE MAP PREPARED BY U. S. DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY

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